REMARKS

Claims 13 - 23 are in this application and presented for consideration. By this Amendment, Applicant has amended claims 13 - 22. Claims 1 -12 have been canceled. Applicant has added new independent claim 23.

Claims 13 -16 and 18 -19 have been rejected under 35 U.S.C. 103(a) is being unpatentable over Pfister (US 5,220,608) in view of Hulsebus (US 6,257,365).

The present invention relates to a reflecting wave guide for emitting sound in vertical line arrays from a sound emission plane consisting in a flat sound source. The reflecting wave guide comprises a double reflection feature. A sound reflection surface is positioned in front of the sound emission plane. The sound reflection surface receives the sound emission plane and transforms the sound emission plane into a real point source. A reflection surface diffuses the sound from the real point source towards a measurement or listening position. The prior art as a whole fails to disclose such features.

The present invention solves the problem of using everyday loudspeakers to produce sound in vertical line arrays. In order to produce a vertical line array, the sound sources have to be closely coupled and have to have a distance between them of no more than half a wavelength, referred to the highest frequency to sound source has to produce. This requirement is easy to achieve at low frequencies. However, it is problematic to fulfill such a requirement for reproducing frequencies up to 10,000 Hz since such small and minute loudspeakers would have to be used, which would be highly inefficient. As such it becomes practically impossible to use traditional loudspeakers, such as cone or dome units, in order to create vertical line

arrays that operate effectively at high frequencies. The present invention advantageously solves the problem of using traditional loudspeakers to produce sound in vertical line arrays that operate effectively at high frequencies. This advantageously provides for a wave reflecting guide of a simple design that is inexpensive to manufacture.

Pfister discloses a method and means for stereophonic sound reproduction. A microphone 1 is connected by a line to a loudspeaker 3. The outer circumference of the loudspeaker basket 5 is secured to a central opening within a larger reflector 6 whose concave inner side has a sound reflecting surface 7 of parabolic shape. A second reflector 9, smaller and distanced from loudspeaker 3, is concentric with the large outer reflector 6. A convex surface of the second reflector 9 faces the concave surface of reflector 6. A portion of the total sound outputted by the loudspeaker 3 impinges on the opposite convex surface of the smaller reflector 9. Another portion of the total sound admitted by the loudspeaker 3 bypasses reflector 9 and deflects into a circular area 12. The first sound portion intercepted by reflector 9 is equal in volume to the bypassed or deflected portion of sound.

Pfister fails to teach or suggest the combination of a sound reflection surface transforming a sound emission plane into a real point source. At most, Pfister teaches transforming a mono source into a stereo source by dividing the sound emission of an audio source into two halves and displacing the phases one from the other using a dual reflector that operates only on one of the two halves. In contrast to Pfister, the present invention takes a different approach. In the present invention, a primary sound source is transformed into a real point source, which allows for the optimum condition of sound reflection for each reflection

surface so that vertical line arrays can be produced that operate effectively at high frequencies. Pfister fails to disclose that the convex surface 10 of the second deflector 9 transforms a sound emission plane into a real point source. In fact, Pfister teaches away from the present invention by disclosing that sound is split into two equal volumes so that one half of the sound emitted is delayed compared to the other half of the emitted sound. In contrast to Pfister, the present invention is not concerned with splitting the sound plane into halves and instead provides a sole coherent phased emission for all the points of the emission surface. As compared to the present invention, Pfister accomplishes the exact opposite objective of the present invention by dividing the sound emission into two halves, which take two different paths that become out of phase. As such, the prior art as a whole teaches a different approach and fails to suggest the features of the present invention.

Hulsebus discloses a speaker system including a cone reflector connected to a speaker driver. Hulsebus discloses that a single point source speaker driver may be used as the speaker driver. The cone reflector has at least one included angle used to reflect sound in a desired pattern in horizontal and vertical planes. The sound dispersed in the vertical plane is a function of the included angles. Angles are varied or more included angles are added to achieve certain sound energy distributions. The speaker driver is located above the cone reflector with the narrower end of the cone facing the output of the speaker driver. Sound generated by the speaker driver is reflected off the cone reflector and dispersed as a function of the included angles of the cone reflector.

Hulsebus fails to teach and fails to provide any motivation for the combination of a

sound reflection surface transforming a sound emission plane into a real point source. At most Hulsebus discloses a cone reflector connected to a single point source speaker driver. However, the single point source speaker drivers merely produce sound from a single point that expands in all directions. Hulsebus fails to provide any motivation or suggestion for how the single point source speaker driver reflects the sound emission plane. At most, Hulsebus merely discloses a single point source speaker driver that emits sound. Hulsebus fails to teach that the single point source speaker driver in any way reflects a sound plane to create a real source point. In contrast to Hulsebus, the present invention provides a sound reflection surface which transforms a sound emission plane into a real point source. This advantageously allows a reflection surface to diffuse the sound in vertical line arrays towards a measurement or listening position. The single point source speaker driver disclosed in Hulsebus merely emits sound and fails to transform the sound by reflecting the sound off of a sound reflection surface. In contrast to the present invention, Hulsebus fails to be concerned with the problem of creating vertical line arrays that operate efficiently at high frequencies. The references provide no direction or using teachings of Hulsebus to modify Pfister. The references together provide no basis which would lead or direct the person of ordinary skill in the art toward the combination as claimed. Accordingly, Applicant respectfully requests that the Examiner favorably consider claim 13 as now presented and all claims that respectively depend thereon.

Claim 17 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Pfister in view of Hulsebus, and further in view of Olson (US 3,105,113). Although Olson teaches a stereophonic loudspeaker system, the references as a whole fail to suggest the combination

of features claimed. As previously discussed above, Pfister and Hulsebus fail to teach the combination of a sound reflection surface transforming a sound emission plane into a real point source. The references do not suggest the invention and therefore all claims define over the prior art as a whole.

Claim 20 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Pfister in view of Hulsebus, and further in view of Rexroat (US 6,393,131) and Noselli (EP 1137318 A2). Although Noselli teaches a directive speaker system for controlling the acoustic field diffused outside an acoustic area, the references as a whole fail to suggest the combination of features claimed. As previously discussed, Pfister and Hulsebus fail to teach the combination of a sound reflection surface transforming a sound emission plane into a real point source. Further, Noselli fails to disclose a double reflection as claimed. The references do not suggest the invention and therefore all claims define over the prior art as a whole.

Claim 21 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Pfister in view of Hulsebus, Rexroat and Noselli, and further in view of Zurek (US 6,292,573). Although Zurek teaches a portable communication device with a collapsible speaker, the references as a whole fail to suggest the combination of features claimed. Pfister and Hulsebus fail to teach the combination of a sound reflection surface transforming a sound emission plane into a real point source. The references do not suggest the invention and therefore all claims define over the prior art as a whole.

Claim 22 has been rejected under 35 U.S.C. 103(a) as being unpatentable over Pfister in view of Hulsebus, Rexroat and Noselli, and further in view of Hughes (US 6,147,748).

Although Hughes teaches a laser tracking for use in distance measurement, the references as a whole fail to suggest the combination of features claimed. As already discussed, Pfister and Hulsebus fail to teach the combination of a sound reflection surface transforming a sound emission plane into a real point source. The references do not suggest the invention and therefore all claims define over the prior art as a whole.

Applicant has added new independent claim 23. New independent claim 23 is similar to independent claim 13 and provides for similar features in different claim language. Independent claim 23 has been added to clarify the invention, specifically the double reflection feature. Independent claim 23 also provides for advantages already discussed in regard to claim 13. Accordingly, Applicant respectfully requests that the Examiner favorably consider new independent claim 23 as presented.

The prior art as a whole fails to direct the person of ordinary skill in the art toward the features of the invention. Further, the invention includes cooperating features which provide particular advantages which are neither taught nor suggested by the prior art. Accordingly, Applicant requests that the Examiner favorably consider the amended claims in light of the discussion above.

Further and favorable consideration on the merits is requested.

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